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(FILE 'HOME' ENTERED AT 09:31:29 ON 18 MAR 2004)
FILE 'CA' ENTERED AT 09:31:42 ON 18 MAR 2004
L1 38561 S (CANCER OR TUMOR) (5A) (DETECT? OR DETERMIN? OR DIAGNOS?)
L2 49 S L1 AND MICROWAVE
L3 9139 S (BONE OR CARTEL?) (5A) (DETECT? OR DETERMIN? OR DIAGNOS?)
L4 33 S L3 AND MICROWAVE
L5 81 S L2,L4
L6 59 S L5 NOT PY>2000
FILE 'BIOSIS' ENTERED AT 09:34:50 ON 18 MAR 2004
L7 98 S L6
FILE 'MEDLINE' ENTERED AT 09:35:32 ON 18 MAR 2004
L8 89 S L6
FILE 'CA' ENTERED AT 09:35:52 ON 18 MAR 2004
L9 2 S L1,L3 AND (EM OR RADIO FREQUENCY OR RF OR ELECTROMAGNETIC RADIATION)
AND(MHZ OR GHZ)
FILE 'BIOSIS' ENTERED AT 09:38:06 ON 18 MAR 2004
L10 7 S L9
FILE 'MEDLINE' ENTERED AT 09:38:28 ON 18 MAR 2004
L11 7 S L9
FILE 'CA, BIOSIS, MEDLINE' ENTERED AT 09:39:18 ON 18 MAR 2004
L12 183 DUP REM L6 L9 L7 L10 L8 L11 (79 DUPLICATES REMOVED)

=> d bib,ab 1-183

L12 ANSWER 2 OF 183 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
AN 2001:43410 BIOSIS
TI **Microwave antenna for cancer detection system.**
AU Bridges, Jack E. [Inventor, Reprint author]; Taflov, Allen [Inventor];
Hagness, Susan C. [Inventor]; Sahakian, Alan [Inventor]
CS Park Ridge, IL, USA
ASSIGNEE: Interstitial, Inc., Park Ridge, IL, USA
PI US 6061589 May 09, 2000
SO Official Gazette of the United States Patent and Trademark Office Patents,
(May 9, 2000) Vol. 1234, No. 2. e-file.
AB A **microwave** antenna for use in a system for **detecting** an incipient **tumor** in
living tissue such as that of a human breast in accordance with differences in
relative dielectric characteristics. In the system a generator produces a non-
ionizing electromagnetic input wave of preselected frequency, usually exceeding
three gigahertz, and that input wave is used to irradiate a discrete volume in
the living tissue with a non-ionizing electromagnetic wave. The illumination
location is shifted in a predetermined scanning pattern. Scattered signal
returns from the living tissue are collected and processed to segregate skin
tissue scatter and to develop a segregated backscatter or return wave signal;
that segregated signal, in turn, is employed to detect any anomaly indicative
of the presence of a tumor or other abnormality in the scanned living tissue.
The present invention is directed to a composite Maltese Cross or bow-tie
antenna construction employed to irradiate the living tissue and to collect
backscatter or other scatter returns.

L12 ANSWER 21 OF 183 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
AN 2000:285326 BIOSIS
TI **Microwave detection of tumors, particularly breast tumors.**
AU Carr, Kenneth L. [Inventor, Reprint author]
CS Harvard, MA, USA

ASSIGNEE: Microwave Medical Systems, Inc., Acton, MA, USA

PI US 5983124 November 09, 1999

SO Official Gazette of the United States Patent and Trademark Office Patents, (Nov. 9, 1999) Vol. 1228, No. 2. e-file.

AB **Microwave tumor detection** apparatus includes a probe having a working end arranged to contact tissue. Positioned in the probe is at least one rectangular waveguide each waveguide having an aperture at the working end of the probe. The waveguides constitute antennas tuned to receive **microwave** radiation emitted by the tissue opposite the working end of the probe. Each waveguide is coupled electrically and mechanically to a dedicated radiometer in the probe for detecting the temperature of tissue opposite that waveguide. These radiometers have thermally conductive casings which are mounted to a common heat sink and are insulated so that all of the radiometers have a uniform thermal distribution. Also, a thin thermally insulating interface pad may be located between the working end of the probe and the tissue contacted by the probe to prevent such contact from causing changes in the surface temperature of the tissue. A method of **detecting breast tumors** is also disclosed.

L12 ANSWER 30 OF 183 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN

AN 1999:215488 BIOSIS

TI Thermoacoustic CT with radio waves: A medical imaging paradigm.

AU Kruger, Robert A. [Reprint author]; Kopecky, Kenyon K.; Aisen, Alex M.; Reinecke, Daniel R.; Kruger, Gabe A.; Kiser, William L., Jr.

CS Department of Radiology, Indiana University School of Medicine, 541 Clinical Dr, CL 120, Indianapolis, IN, 46202-5111, USA

SO Radiology, (April, 1999) Vol. 211, No. 1, pp. 275-278. print.

AB The authors evaluated images obtained with a prototypic thermoacoustic computed tomographic (CT) scanner constructed for use at 434 **MHz**, a promising **radio frequency** for **detecting breast cancer**. In one excised porcine kidney, acoustic energy emanating from the kidney was detected with transducers. The resultant electric signals were used to create a three-dimensional data set. Two-dimensional images reconstructed in multiple planes were compared with state-of-the-art T1- and T2-weighted magnetic resonance images. The renal outline, parenchyma, and collecting system were clearly delineated on the thermoacoustic CT images.

L12 ANSWER 36 OF 183 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN

AN 2002:129360 BIOSIS

TI **Microwave** method and system to **detect** and locate **cancers** in heterogenous tissues.

AU Bridges, J. E. [Inventor]

CS Park Ridge, Ill., USA

ASSIGNEE: INTERSTITIAL, INC.

PI US 5829437 Nov. 3, 1998

SO Official Gazette of the United States Patent and Trademark Office Patents, (Nov. 3, 1998) Vol. 1216, No. 1, pp. 143. print.

L12 ANSWER 37 OF 183 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN

AN 2002:122590 BIOSIS

TI **Microwave detection** apparatus for locating cancerous **tumors** particularly breast tumors.

AU Carr, K. L. [Inventor]

CS Harvard, Mass., USA

ASSIGNEE: MICROWAVE MEDICAL SYSTEMS, INC.

PI US 5779635 July 14, 1998

SO Official Gazette of the United States Patent and Trademark Office Patents,
(July 14, 1998) Vol. 1212, No. 2, pp. 1594-1595. print.

L12 ANSWER 39 OF 183 MEDLINE on STN
AN 1999052260 MEDLINE
TI Two-dimensional FDTD analysis of a pulsed **microwave** confocal system for breast
cancer detection: fixed-focus and antenna-array sensors.
CM Erratum in: IEEE Trans Biomed Eng 1999 Mar;46(3):364
AU Hagness S C; Taflove A; Bridges J E
CS Department of Electrical and Computer Engineering, University of Wisconsin-
Madison 53706, USA.. hagness@engr.wisc.edu
SO IEEE transactions on bio-medical engineering, (1998 Dec) 45 (12) 1470-9.
AB A novel focused active **microwave** system is investigated for **detecting tumors**
in the breast. In contrast to X-ray and ultrasound modalities, the method
reviewed here exploits the breast-tissue physical properties unique to the
microwave spectrum, namely, the translucent nature of normal breast tissues and
the high dielectric contrast between malignant tumors and surrounding lesion-
free normal breast tissues. The system uses a pulsed confocal technique and
time-gating to enhance the **detection** of **tumors** while suppressing the effects of
tissue heterogeneity and absorption. Using published data for the dielectric
properties of normal breast tissues and malignant tumors, we have conducted a
two-dimensional (2-D) finite-difference time-domain (FDTD) computational
electromagnetics analysis of the system. The FDTD simulations showed that
tumors as small as 2 mm in diameter could be robustly detected in the presence
of the background clutter generated by the heterogeneity of the surrounding
normal tissue. Lateral spatial resolution of the tumor location was found to
be about 0.5 cm.

L12 ANSWER 56 OF 183 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
AN 2002:83270 BIOSIS
TI **Microwave detection** apparatus for locating cancerous **tumors** particularly
breast tumors.
AU Carr, K. L. [Inventor]
CS Harvard, Mass., USA
ASSIGNEE: MICROWAVE MEDICAL SYSTEMS, INC.
PI US 5662110 Sept. 2, 1997
SO Official Gazette of the United States Patent and Trademark Office Patents,
(Sept. 2, 1997) Vol. 1202, No. 1, pp. 98. print.

L12 ANSWER 112 OF 183 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
AN 1993:132274 BIOSIS
TI **Microwave** radiometry in biomedicine: A reappraisal.
AU Foster, Kenneth R. [Reprint author]; Cheever, Eric A.
CS Dep. Bioengineering, Univ. Pennsylvania, 220 S. 33rd St., Philadelphia, Pa.
19104-6392, USA
SO Bioelectromagnetics, (1992) Vol. 13, No. 6, pp. 567-579.

L12 ANSWER 113 OF 183 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
AN 1992:148475 BIOSIS
TI DIELECTRIC PROPERTIES OF FEMALE HUMAN BREAST TISSUE MEASURED IN-VITRO AT 3.2
GHZ.
AU CAMPBELL A M [Reprint author]; LAND D V
CS DEP PHYSICS ASTRONOMY, UNIVERSITY GLASGOW, GLASGOW G12 8QQ, UK
SO Physics in Medicine and Biology, (1992) Vol. 37, No. 1, pp. 193-210.
AB Complex permittivities of in vitro diseased and undiseased human female breast
tissues have been measured at 3.2 GHz using a resonant cavity technique.

Ranges of dielectric properties and water contents of these tissues are presented. Experimental data are compared with models predicted from mixture equations. Measured permittivity data lie within limits set by two-phase mixture theory, but some conductivity data are in excess of those expected for a mixture of saline and protein. At any particular **microwave** frequency of all tissue of a given type, the relationship between permittivity and conductivity may be parametrized using the Debye relaxation equations. For each breast tissue type a characteristic relaxation frequency was calculated and found to be lower than that of physiological saline at the same temperature. It is concluded that the dielectric relaxation of tissue water is not the only dispersive process occurring at this frequency: dielectric relaxation of bound water and the tail end of a β -dispersion may also contribute to the dielectric properties. The similarity of the dielectric properties of benign and malignant breast tumours measured in this work suggest that in vivo dielectric imaging methods will not be capable of distinguishing them.

- L12 ANSWER 122 OF 183 CA COPYRIGHT 2004 ACS on STN
 AN 116:95553 CA
 TI **Microwave** radiometry imaging: characterization of breast tumors
 AU Giaux, G.; Delannoy, J.; Delvaley, D.; Leroy, Y.; Mamouni, A.; Van de Velde, J. C.; Bocquet, B.
 CS Cent. Lutte Cont. Cancer Oscar Lambret, Lille, Fr.
 SO Journal of Photographic Science (1991), 39(4), 164-5
 AB A **microwave** imaging (MI) device working at 3 GHz was used to record temp. images of early breast tumors; 25 patients were investigated prior to surgery. For every patient, the excised tissue was examd. histol. Of these patients studied using both MI and histol., 22 were found to have only benign lesions. Histol. and MI found a malignant tumor in 3 patients. In all the 25 selected patients, the nature of the **tumors** could not be **detd.** by clin. examn., x-ray mammog. and cytol. The results of the **microwave** imaging are therefore encouraging in the **detection** of **cancer**.
- L12 ANSWER 131 OF 183 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
 AN 1991:93407 BIOSIS
 TI POSSIBILITY OF ACCOMPANYING ELECTROMAGNETIC THERAPY WITH THERMOGRAPHY IN SENOLOGICAL DIAGNOSIS.
 AU VERMIGLIO G [Reprint author]; TAMA S; SANSOTTA C; DENUZZO G; PULEJO A
 CS UNIV STUDI MESSINA, I CATTEDRA FISICA MED E SERVIZIO FISICA SANTARIA, ITALY
 SO Giornale Italiano di Senologia, (1990) Vol. 11, No. 3, pp. 83-88.
 LA ITALIAN
 AB The idea that malignant neoplasia can be treated, when diagnosed in preclinic stage has always risen larger and larger interest on the use of diagnostic devices. Several techniques of approach to the neoplastic tissue were developed in these recent years, techniques which make use of non ionizing radiation, i.e. termography, echotomography. As a matter of fact non invasive diagnostic approaches are being preferred and developed in these recent years. The proposal we worked out concerns with these techniques. It starts from a study on the dielectric and thermic properties of normal and neoplastic tissues and aims at the exploitation of a selective electromagnetic (E.M.) uptake from the mammary tumor cells compared with normal cells for diagnostic purpose. In fact it is well known that at the moment, for therapeutic reasons, we are seeking through several techniques (dielectric system, inductive system) to obtain a heating the most selective as possible of the tumoral mass, with uniform distribution of the heat within the same mass (hyperthermia). As heat source there can be used several kinds of devices: - at radiofrequencies,

between 10 and 100 Mhz; - at **microwaves**, between 2 and 90 GHz. Therefore it seems possible to exploit for diagnostic purposes this kind of selective heating to set up a method which tends to eliminate the false positive. In fact, subjecting the female patients (whose thermographic pictures shows areas with thermic distribution with equivocal interpretation) to a selective E.M. stimulation, one should have at his disposal a device capable to perform a sole and discriminatory interpretation of the effective pathologic pictures. At the very moment we are performing deeper investigation the most proper stimulation sources.

- L12 ANSWER 146 OF 183 MEDLINE on STN
AN 88004492 MEDLINE
TI **Microwaves** in breast **cancer detection**.
AU Edrich J
CS Department of Radiology, Swedish Medical Center, Englewood-Denver, Colorado.
SO European journal of radiology, (1987 Aug) 7 (3) 183-93.
- L12 ANSWER 171 OF 183 MEDLINE on STN
AN 80051933 MEDLINE
TI **Microwave** thermography: principles, methods and clinical applications.
AU Myers P C; Sadowsky N L; Barrett A H
SO Journal of microwave power, (1979 Jun) 14 (2) 105-14.
AB We review the physical principles, method of operation, measurement limitations, and potential medical applications of **microwave** thermography. We present detailed results of a study of breast **cancer detection** at 1.3 and 3.3 GHz, including the dependence of **detection** rates on **microwave** frequency, time, **tumor** depth, and tumor size. At 1.3 GHz, **microwave** thermography **detects** breast **cancer** as well as infrared thermography (true-positive rate = 0.76 when true-negative rate = 0.63). When the two methods are combined, the true-positive rate increases by about 0.1 over that of either method alone.
- L12 ANSWER 172 OF 183 MEDLINE on STN
AN 80051949 MEDLINE
TI Centimeter- and millimeter-wave thermography--a survey on **tumor detection**.
AU Edrich J
SO Journal of microwave power, (1979 Jun) 14 (2) 95-104. Ref: 33
AB Thermography at centimeter and millimeter wavelengths can measure subsurface temperatures of the human body. Radiative and bio-heat transfer influence the wavelength dependent subcutaneous temperature and spatial resolution. Recent clinical results in treatment monitoring of arthritis, **detection** of **tumors** in the neck and brain area, and breast cancer are reviewed.
- L12 ANSWER 179 OF 183 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
AN 1977:159160 BIOSIS
TI SUB CUTANEOUS TEMPERATURES A METHOD OF NONINVASIVE SENSING.
AU BARRETT A H; MYERS P C
SO Science (Washington D C), (1975) Vol. 190, No. 4215, pp. 669-671.
AB A new method of noninvasive sensing of the subsurface temperature distribution in human and animal tissue is described. Thermal radiation emitted from subsurface depths of several centimeters can be detected with **microwave** receivers. Temperature sensitivity of the order 0.1° C and spatial resolution of approximately 1 by 2 cm were obtained. Measurements demonstrating the technique with feline and human tissue are reported. A potential medical application is the detection of subsurface thermal anomalies such as malignant tumors and regions of vascular insufficiency.

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